



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/252,514	02/18/99	NANDAKUMAR	M TI-23103

023494 MMC1/0808  
TEXAS INSTRUMENTS INCORPORATED  
P O BOX 655474, M/S 3999  
DALLAS TX 75265

EXAMINER

CARROLL, J

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 08/08/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks



UNITED STATES DEPARTMENT OF COMMERCE  
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
---------------	-------------	----------------------	---------------------

EXAMINER
----------

ART UNIT	PAPER NUMBER
----------	--------------

3

DATE MAILED:

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined. ☐ Responsive to communication filed on \_\_\_\_\_ ☐ This action is made final.  
A shortened statutory period for response to this action is set to expire THREE (3) month(s), --- days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input type="checkbox"/> Notice re Patent Drawing, PTO-948.                   |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.                 | 4. <input type="checkbox"/> Notice of informal Patent Application, Form PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474.     | 6. <input type="checkbox"/> _____  |

Part II SUMMARY OF ACTION

1. ☒ Claim(s) 1 through 17 are pending in the application.  
Of the above, claim(s) \_\_\_\_\_ is withdrawn from consideration.
2. ☐ Claim(s) \_\_\_\_\_ has been canceled.
3. ☐ Claim(s) \_\_\_\_\_ is allowed.
4. ☒ Claim(s) 1 through 17 are rejected.
5. ☐ Claim(s) \_\_\_\_\_ is objected to.
6. ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawing(s) under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawing(s) are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_ has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction(s), filed on \_\_\_\_\_, has been ☐ approved. ☐ disapproved (see explanation).
12. ☐ Acknowledgment is made of the claim for priority under 35 USC 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

The Official Draftsperson approved the formal drawings.

Claims 1 through 17 comply with the requirements of 35 U.S.C. 112.

Under 35 U.S.C. 103, we reject as unpatentable Claims 1 through 4, Claims 7 through 11, and Claims 14 through 16 over considerations of presently cited and provided Bindal. More particularly, Bindal disclosed a field effect transistor (Figure 1) that included each of an N-type source region (24) and an N-type drain region (26) adjacent a P-type channel region therebetween consisting of two doped regions (Figure 2): a) boron-doped first region shown as "B" curve and located nearest interface (30); b) arsenic counter-doped second region (14), underlying the first region and shown as "As" curve, to render the "NET ACCEPTOR PROFILE" curve. We thus conclude it to have been obvious for one to have readily achieved the claimed subject matter by simply following the expressed teachings and suggestions of Bindal.

*In re* Claim 2, evidently from Figure 2, the dopant concentration of the boron doped first region exceeded the net boron-acceptor dopant concentration of the arsenic counter-doped second region.

*In re* Claim 3, Bindal anticipated a complementary N-channel transistor, evidently from the parenthetical dopant types indicated in Figure 1, and the complementary transistor structure of Figure 10 that included an N-channel transistor.

*In re* Claim 4, Bindal anticipated using boron material to render the first channel region, and further anticipated using arsenic dopant material to render the second channel region.

Under 35 U.S.C. 103, we reject as unpatentable Claims 6 and 13 over Bindal considered with presently cited and provided Jain. Bindal expected to apply the advantageous channel consisting of the first and second doped regions to other field effect transistor structures, including those disclosed by Jain that included the transistor structure of Figure 2 that comprised highly doped P-type halo regions (36) (38) surrounding N-type, lightly doped source and drain regions. We thus conclude

it to have been obvious for one to have advantageously applied the Bindal desirable channel region to the Jain transistor. As such, one would have readily achieved the claimed subject matter by simply following the expressed teachings and suggestions of Jain and Bindal.

Under 35 U.S.C. 103, we reject as unpatentable Claims 5, 12 and 17 over the prior art information as applied *supra* against Claims 1, 11 and 15, but further considered with presently cited and provided Miller *et al.* More particularly, Bindal advocated the use of boron and arsenic dopant materials to render the claimed channel regions. Miller *et al.* indicated (paragraph beginning on line 55, column 6) that each of boron, arsenic and phosphorus dopant materials were essentially interchangeable. We thus conclude it to have been obvious for one to have accordingly interchanged the dopant materials of Bindal with those of Miller *et al.* As such, one would have readily achieved the claimed subject matter by simply following the expressed teachings and suggestions of Miller *et al.* and Bindal

We reject all Claims.

An inquiry concerning this communication may be directed to Examiner J. Carroll at telephone number 703-308-4926 or, to the Reception Person for Technology Center 2800 at telephone number 703-308-0956. Written communications may be received in Art Unit 2811 at telefax number 703-308-7724.

Respectfully submitted.

James J. Carroll  
Primary Examiner